managing fishery affairs than a landsman who happens to be master of the theory of navigation is the right man to be trusted with steering an ironclad.

The whole lesson of my somewhat lengthy and varied experience of fishery matters may be summed up thus: —

1. Don't meddle, unless you have good grounds for believing that you know what the effect of your meddling will be.

2. Listen to all that the scientific men without practical knowledge and the practical men without scientific knowledge have to say, but give to neither the power of directly interfering with such a large and important branch of industry as fishing.

3. Collect all the information that is to be had, so that the country may know year by year how the fisheries really stand; make that information accessible to the people who are engaged in the fishing industry; inquire into real or supposed grievances; and regulate or restrict, experimentally, on good cause shown.

4. Let the department charged with these duties obtain such scientific help as is needful from persons of recognized scientific competency, who are not under the control of the administrative department, and are not responsible to any one for the conclusions at which they may arrive. Moreover, let all scientific inquiries thus undertaken be strictly relevant, not merely to fishery matters, but to questions with which the state may properly deal as the representative of the general interest.

If the government is to be asked to give a body of scientific men a roving commission to inquire into the natural history of the seas and rivers of England, let that issue be put plainly before the minister to whom the application is made. But I do not see what the board of trade has to do with such 'aid to science,' nor why it is desirable that the gentlemen who are to be intrusted with this very considerable enterprise should have the 'management of the fisheries' — which means the power of meddling with a great industrial interest — thrown in as a sort of *hors d'oeuvre*.

T. H. HUXLEY.

March 20.

EXPLOSIONS IN COAL-MINES.

ATTENTION has been called to the connection which exists between gas-explosions in coal-mines and certain atmospheric conditions, which is expressed by saying that the number of such explosions is very considerably greater under low atmospheric pressure (under so-called barometric depression) than with a normal or high barometer. This is not a newly discovered fact, for it was recognized by Dickinson as early as 1852; and for nearly ten years past barometers have been used in many English coal-mines for observing the condition and changes of atmospheric pressure, and estimating therefrom, to some extent, the danger which may come from the latter source. But there is a growing conviction that the whole question needs further investigation, and particularly that experimental tests are necessary. Such tests, however, are very expensive, and for that reason little has been done hitherto in that direction. All the more noteworthy, therefore, are the numerous experiments which were undertaken last summer at the mines of Archduke Albert in Karwin, and which were on such a scale that the working of the entire mine was suspended at times in order to give a free field to the scientific investigations. Professor Suess has recently given an account of these important investigations in the geological institute at Vienna.

The district in which these observations were made comprises the greatest part of the archducal Gabriela mine. This portion obtains its fresh air from the Gabriela shaft, while the principal air-shaft, 500 metres to the west, serves as the up-cast shaft. At the latter a Quibal ventilator of 7.04 metres diameter was in operation during the whole course of the experiments. A similar ventilator of 12 metres diameter has been introduced recently.

The seams of the Gabriela mine belong to the most easterly portion of the Ostran-Karwin district, just on the edge of the Carpathian Mountains; and the mine joins the district of the Johann-Schacht where the accident of March 6, 1883, occurred. The stratification is nearly horizontal. On one occasion, after work in the mine had been stopped for six hours, the freshly exposed surface, where the miners had been at work, gave a crackling, blowing, and slightly hissing sound over its whole extent; and the escape of gas was detected not only by the lamp, but by the ear. Many of the puddles of water on the floor of the level were in slight agitation from the gas bubbling up through them. The old surfaces, however, were quiet, and experience has shown that the portions of the seam lying nearest workings lose their gas sooner or later, and cease to be dangerous. For the reason above explained, also, the working of drifts running directly into the seam requires the greatest precaution, and in the whole Ostran-Karwin district double workings are carried on in the deep levels for the sake of ventilation. The escaping gas is carried along by the draught produced by the ventilation, but local accumulations are unavoidable.

In order to obtain clear and convincing results in the investigations under discussion, a long series of analyses of the air from the well and regularly ventilated mine was made at the same time that barometric observations were taken. For the latter purpose a barograph was placed in the lowest part of the mine, at a depth of 230 metres, and the close correspondence between the changes of pressure at the surface and in the mine was ascertained. There a large number of daily analyses were made of the air taken from the ventilator, and also of air taken from a level in the seam by an independent apparatus.

These experiments were commenced in the beginning of June, 1885, and are still going on. The first report published by the archducal finance director in Teschen, based on the experiments made from June 5 to July 13, shows, that, when the barometer fell, the proportion of explosive gas in the ventilator and mine increased. The later experiments confirm this result in the most striking manner. The report referred to expresses the results of the early experiments as follows: —

1. The proportion of explosive gas in the mine air, generally speaking, decreases with increasing atmospheric pressure, and increases with a decreasing pressure.

2. The proportion of gas increases more rapidly the more suddenly the barometric curve falls, and decreases more rapidly the more suddenly the curve rises.

3. The development of the gas does not depend on the absolute amount of barometric depression.

4. If the barometric curve ascends at first suddenly and then slowly, or remains stationary for some time after reaching a maximum, a slow increase of gas is observed. If, after a sudden fall of the barometer, the pressure continues to decrease slowly, or remains stationary some time after reaching a minimum, a slow decrease of gas is observed. The maximum and minimum of the barometric curve, therefore, do not always correspond to the minimum and maximum of the gas curve.

Not content with these observations, a further series of experiments was undertaken. Work on the mine was stopped, and the air-supply shaft was closed while the ventilator was kept running, This experiment was begun at noon on June 20, and continued twenty-seven hours. In order to obtain the usual number of revolutions of the ventilator, the steam-pressure had to be increased. The barometric pressure in the mine sank 2.2 millimetres in five minutes, while the proportion of gas at the ventilator (which was ventilating other workings at the same time) rose to 0.83 per cent, and, at the level where separate collection was made, to about 0.40 per cent. In subsequent experiments a barometric depression of 4 millimetres was reached in the mine, the ventilator stopped, and in one case the gas in the level reached 1.35 per cent. This artificial depression of from 2.2 millimetres to 4 millimetres is certainly small in comparison with the natural variations in atmospheric pressure which are going on all the time, but its sudden production accelerated proportionally the flow of gas in the mine. Of the five severest accidents in coal-mines which have happened recently, four occurred during periods of especially low barometer. The accident at Polish Ostran on the 8th of October, 1884, occurred when the barometer sank 11 millimetres in forty-eight hours. The explosion at Karwin on March 6, 1885, took place on the second day of the fall of the barometer, which lasted three days and amounted to 16 millimetres. That at Saarbrücken occurred also on the second day of a fall of about 13 millimetres; and that at Clifton Hall on June 18, 1885, took place at the beginning of a fall. The accident at Dombran on March 7, 1885, is generally attributed to coal-dust. To these five accidents must now be added that at Spekul in Banat, which took place at nine o'clock in the morning of Oct. 29, 1885. In the absence of more accurate data, it may be remarked that on the 28th of October the barometer was 754.2 millimetres at seven in the morning, at Hermannstadt; on the 29th it was 750.6 millimetres, and on the 30th 749.8 millimetres.

It is superfluous to enlarge upon the experiments at Karwin. They confirm the views of the English experts and those expressed by Cowen before the English parliament in 1878, and it may be presumed that they will produce a change of opinion in other countries where those views are not known. They show the great importance of the barometer in coal-mining. The isobar-charts, which are obtaining a wider publication every year, show the daily progress of barometric minima over Europe, and they should be consulted in future by the managers of every coal-mine. The order is already in force at Karwin, forbidding blasting at all dangerous points on the approach of a barometric depression, and, if the danger increases, all work is to be suspended. M.

NOTES AND NEWS.

DR. PALISA of Vienna detected still another small planet, April 5: it was of the thirteenth magnitude, and will bring the total number of these bodies up to 257.

— The national museum has received a fine speci-